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MP

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/275,534 03/24/99 JAHN

P BAYER10.168W

EXAMINER

IM62/0203

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ART UNIT	PAPER NUMBER
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1723

DATE MAILED:

02/03/00

#6

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/275,534

Applicant(s)

JAHN ET AL.

Examiner

David L. Sorkin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14, 15 and 17-22 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 April 1999 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☒ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 14) ☒ Notice of References Cited (PTO-892)
- 15) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 16) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 17) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 18) ☐ Notice of Informal Patent Application (PTO-152)
- 19) ☐ Other: _____.

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DETAILED ACTION

1. In the cases of claims 14 and 22 it has been assumed, for the purposes of examination, that "Mixer arrangement according to Claim 11" should read – Mixer arrangement according to Claim 12 --, because claim 11 is not drawn to a mixer arrangement.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Channels running concentrically as in instant claim 1 must be shown or canceled from the claim(s). Also, the angle of +30 or -30 degrees in instant claim 4 must be shown or canceled from the claim(s).

No new matter should be entered.

Claim Objections

3. Claim 13 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim. This claim does not refer back in the alternative as required. See MPEP § 608.01(n). Accordingly, the claim 13 has not been further treated on the merits.

4. Claims 14 and 22 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s)

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in proper dependent form, or rewrite the claim(s) in independent form. Claims 14 and 22 refer to "Mixer arrangement according to Claim 11", but claim 11 is not drawn to a mixer arrangement.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 22 and 17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is quite unclear what is being claimed in 22 and 17 (see rejections under the second paragraph of 35 U.S.C. 112), but to the extent which they are understood, they are not enabled. In claim 22, a module which engages into another module is claimed. While, a module engaging into a void defined by the boundaries of another module is enabled, two modules which occupy the same region are not. More specifically, no second module is enabled which engages into the space between the front and rear planes of a region of another module; however, this is claimed in 22 (and 17).

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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8. Claims 1-12, 14-15, and 17-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 1 recites the limitations "the flanks (8)", "the inlet channels (4)", "the flanks (9)", and "the mixing channels (5)". There is insufficient antecedent basis for these limitations in the claim. These limitations are also recited in other claims.

10. Claim 4 recites the limitation "the mid-axis". There is insufficient antecedent basis for this limitation in the claim. Also, are the orifices required to be of a symmetry such that a mid axis is defined?

11. Claim 4 recites the limitation "the wall". There is insufficient antecedent basis for this limitation in the claim. Also, orifices, being voids, do not have walls, but are defined by walls.

12. Claim 4 recites the limitation "the flanks". It is unclear whether this includes flanks (8), flanks (9), or both.

13. Claim 4 recites the limitation "the channels". It is unclear whether this includes the inlet channels (4), mixing channels (5), or both.

14. Claim 4 recites the limitation "the channels". It is unclear whether this includes the inlet channels (4), mixing channels (5), or both

15. Claims 7 and 22 recite the limitation "a different cross-sectional surface of the orifices". It is considered that orifices, being voids, do not have surfaces.

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16. Claim 11 recites the limitation "the mixer". There is insufficient antecedent basis for this limitation in the claim.

17. Claim 14 recites the limitations "the first mixer module" and "the second mixer module". There is insufficient antecedent basis for these limitations in the claim.

18. Claim 15 recites the limitation "the adjacent disc-shaped static mixer modules". There is insufficient antecedent basis for this limitation in the claim.

19. Claim 15 recites the limitation "the mutually facing mixing channels". There is insufficient antecedent basis for this limitation in the claim.

20. Claim 17 recites the limitation "the unit". There is insufficient antecedent basis for this limitation in the claim.

21. Claim 17 recites the limitation "the engaging static mixer". There is insufficient antecedent basis for this limitation in the claim.

22. Claim 17 recites the limitation "the said plane". It is unclear which plane is being referred to.

23. Regarding claim 17, the meaning of the phrase "having a maximum spacing from the planes of the front side or the rear side respectively" is unclear.

24. Claim 18 recites the limitation "the mixer arrangement". There is insufficient antecedent basis for this limitation in the claim.

25. Claim 18 recites the limitation "of an individual mixer module or of a mixer module", which is unclear because the difference between "an individual mixer module" and "a mixer module" is unclear.

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26. Claim 22 recites the limitations "said static mixer". There is insufficient antecedent basis for this limitation in the claim.

27. Claim 22 recites the limitation "the regions or segments of the disc-shaped static mixer module which have a smaller spacing between the disc plane of the front side and the disc plane of the rear side than the remaining regions or segments". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

28. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

29. Claims 1, 2, 5, 11, 12, 14, 15, 18, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by King (399).

30. Claim 1: King (399) discloses a static mixer module comprising a disc (12) which is provided with a multiplicity of orifices (relatively large rectangular orifices, fig. 3) and which is structured on its front side (2) facing the mix and on its rear side by means of channels running in parallel, and in which the orifices are made in the flanks of the inlet channels and open into the flanks of the mixing channels (fig. 3).

31. Claim 2: The inlet channels of (King 399) have straight flanks which are at an angle of 5-85 degrees to the disc plane (fig. 3).

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32. Claim 5: The inlet channels of (King 399) have a V-shaped cross-sectional profile (fig. 3).

33. Claim 11: The module of (King 399) consists of non-ferrous metal (column 4, line 6).

34. Claim 12: King (399) discloses a mixer arrangement comprising at least two static mixer elements arranged one behind the other (fig. 3), wherein at least one mixer element is the disc-shaped static module described above with regard to instant claim 1.

35. Claim 14: King (399) discloses the positioning of the modules discussed above with regard to instant claim 12 in such a way that the mixing channels of the first mixer module are arranged so as to be rotated relative to the inlet channels of the second mixer module (column 4, lines 44-49).

36. Claim 15: In the mixer arrangement of King (399) discussed above regarding instant claim 14, the adjacent modules have parallel sets of straight inlet channels and mixing channels and the mutually facing mixing channels and inlet channels of the adjacent mixer modules are rotated relative to one another at an angle of 5-175 degrees (column 4, lines 44-49).

37. Claim 18: King (399) discloses a mixer with at least two of the static mixer modules discussed above regarding instant claim 1, in which the mixer modules are installed in a pipe, through which mix flows, in such a way that the front side of a mixer module points in the opposite direction to the direction of the flow of the mix (fig. 3).

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38. Claim 21: The mixer arrangement of King (399) described above with regard to instant claim 12 is installed in a pipe, through which mix flows, in such a way that the front side of an individual mixer module from the mixer arrangement points in the opposite direction to the direction of the mix (fig. 3).

Claim Rejections - 35 USC § 103

39. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

40. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over King (399).

41. The static mixer module of King (399) is described above regarding instant claim 1. King (399) fails to explicitly disclose an angle between a mid-axis or orifice wall and a flank of +30 or -30 degrees. However, it is considered that it would have been obvious to one of ordinary skill in the art to have optimized the angle for a particular application (see MPEP 2144.05 (II)(A)).

42. Claims 3, 10, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over King (399) in view of Jeffers (US 616,191).

43. Claim 3: King (399) discloses the static mixer module discussed above with regard to claim 1. The flanks of the inlet channels are straight, however an angle of 15 degrees is not explicitly disclosed. However, it is considered that it would have been

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obvious to have optimized the angle for a particular application (see MPEP 2144.05 (II)(A)). Additionally, King (399) fails to disclose spacer contours. Jeffers (191) teaches spacer contours (H). It is considered that it would have been obvious to one of ordinary skill in the art to have utilized spacer contours in the module of Kings (399) to aid in the attachment of multiple modules, as taught by Jeffers (191) (page 1, lines 87-99).

44. Claim 19: In the mixer module of King (399) in view of Jeffers (191) discussed above with regard to instant claim 3, the spacer contours are bosses (fig. 3). (Note: for a static mixer with an alternate spacer contour shape see Hodan, US 5,137,369.)

45. Claim 10: King (399) discloses the static mixer module discussed above with regard to claim 1. King (399) fails to disclose the module having on its front side baffle surfaces in the disc plane. Jeffers (191) teaches a module having on its front side baffle surfaces (G). It is considered that it would have been obvious to one of ordinary skill in the art to have utilized baffle surfaces in the disc plane of the module of Kings (399) to aid in the attachment of multiple modules, as taught by Jeffers (191) (page 1, lines 87-99).

46. Claim 20: The baffle surfaces of King (399) in view of Jeffers (191), discussed above with regard to instant claim 10, are flattenings (fig. 3).

47. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over King (399) in view of Hirsch (US 3,572,391).

48. Claim 6: King (399) discloses the static mixer module discussed above with regard to claim 1. King (399) also discloses different arranged inlet channels (12 versus

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13 versus 14). King (399) fails to disclose a disc divided into regions or segments.

Hirsch (391) discloses a disc divided into regions or segments (fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to have incorporated the different arrangements, into different regions of a single disc, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract).

49. Claim 7: King (399) discloses the static mixer module discussed above with regard to claim 1. King (399) also discloses different spacing between orifices (12 versus 13 versus 14). King (399) fails to disclose a disc divided into regions or segments. Hirsch (391) discloses a disc divided into regions or segments (fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to have incorporated the different arrangements, into different regions of a single disc, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract).

50. Claim 8: The static mixer module of King (399) in view of Hirsch (391) is discussed above with regard to instant claim 6. The regions or segments taught by Hirsch (391) are arranged concentrically about the center point of the disc. It is considered that it would have been obvious to one of ordinary skill in the art for the regions of King (399) in view of Hirsch (391) to be concentric, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract).

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51. Claim 9: The static mixer module of King (399) in view of Hircsh (391) is discussed above with regard to instant claim 6. In the different arrangements disclosed by King (399), the spacing between the planes of the front and rear side are also different (spacing of $14 < 13 < 12$).

52. Note: It is especially unclear what is being claimed in claims 22 and 17 (see rejections under 35 U.S.C. 112 above), but these claims have been considered with regard to the prior art to the extent possible.

53. Claims 22 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over King (399) in view of Hirsch (391) and King (US 3,677,300).

54. Claim 22: The arrangement of King (399) is discussed above with regard to instant claim 12. King (399) also discloses different spacing between orifices (12 versus 13 versus 14). The spacing between the planes of the front and rear side are also different (spacing of $14 < 13 < 12$). King (399) fails to disclose a module divided into regions or segments. Hirsch (391) discloses a disc divided into regions or segments (fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to have incorporated the different arrangements, into different regions of a single disc, to prevent the velocity of flow from being different near the walls versus near the center of a pipe, as taught by Hirsch (391) (see abstract). King (399) and Hirsch (391) fail to disclose adaptation to boundaries of one module by another module, such that a portion of one is enclosed by a portion of the other. King (300) discloses a module (31) the outer contour of which is adapted to the boundaries of another module (30). The

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surface of engagement includes engagement at the thinnest part of module (30). It is considered that it would have been obvious to one of ordinary skill in the art to engage the modules as described. One would be motivated to do so to accomplish mixing in as short a length of pipe as possible, which is an advantage recognized by King (399) (column 5, lines 54-58).

55. Claim 17: The mixer arrangement described above with regard to claim 22 is also considered to meet the limitations of claim 17. Fig. 1 of King (300) teaches flush abutment (fig. 1). It is considered that it would have been obvious to one of ordinary skill in the art to abut the modules flushly as described in instant claim 17. One would be motivated to do so to accomplish mixing in as short a length of pipe as possible, which is an advantage recognized by King (399) (column 5, lines 54-58).

Conclusion

56. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hodan (US 5,137,369) was discussed above with regard to instant claim 19. Ziegler (US 4,902,418) discloses a static mixer module with parallel V-shaped inlet and mixing channels which have orifices in their flanks. Round orifices and rectangular orifices are disclosed. Arrangements of a plurality of modules behind one another are disclosed, including ones in which one module is rotated with respect to another. See especially fig. 13. Ohle (US 5,922,970) discloses a disc-shaped static mixer with a plurality of regions with varied channel arrangements and orifice cross-sections and spacings. See especially fig. 3.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Sorkin whose telephone number is 703-308-1121. The examiner can normally be reached on 7:30 - 5:00 Mon.-Thur., Alternate Fridays.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 703-308-0457. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7718 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



David Sorkin

January 21, 2000



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